

EXHIBIT 2

IN THE UNITED STATES DISTRICT COURT
DISTRICT OF ARIZONA
TUCSON DIVISION

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JAMES BLANKINSHIP,)
)
Plaintiff,)
)
v.) CASE NO. 4:21-cv-00072-RM
)
UNION PACIFIC RAILROAD)
COMPANY, A DELAWARE)
CORPORATION,)
)
Defendant.)
_____)

Volume 2 (Pages 17 - 150)

VIDEOTAPED DEPOSITION OF

DOUGLAS IVAN, M.D.

FRIDAY, JUNE 17, 2022

Stenographically Reported by:
KATHRYN S. SWANK, RPR, CSR #13061

1 GAVIN BARNEY, Attorney at Law, of
2 HILDEBRAND MCLEOD & NELSON, 350 Frank H. Ogawa Plaza,
3 4th Floor, Oakland, California 94612, appeared as
4 counsel on behalf of the Plaintiff.

5 Tel: (510) 451-6732

6 E-mail: barney@hmnlaw.com
7

8 JASMINE ANDERSON, Attorney at Law, of
9 CONSTANGY, BROOKS, SMITH, & PROPHETE LLP, 601
10 Montgomery Street, Suite 350, San Francisco,
11 California, 94111, appeared as counsel on behalf of
12 the Defendant Union Pacific Railroad Company.

13 Tel: (415) 918-3018

14 E-mail: janderson@constangy.com
15

16 SCOTT MOORE, Attorney at Law, of
17 BAIRD HOLM LLP, 1700 Farnam Street, Suite 1500, Omaha,
18 Nebraska 68102, appeared as counsel on behalf of the
19 Defendant Union Pacific Railroad Company.

20 Tel: (402) 344-0500

21 E-mail: spmoore@bairdholm.com
22
23
24
25

1 CONNOR ROWINSKI, Attorney at Law, of COZEN
2 O'CONNOR, 999 Third Avenue, Suite 1900, Seattle,
3 Washington, 98104, appeared as counsel on behalf of
4 the Union Pacific Railroad Company.

5 Tel: (206) 224-1296

6 E-mail: crowinski@cozen.com
7

8 JENNIFER SAELEE of FOCUS LITIGATION SOLUTIONS,
9 appeared as the videographer.

10 Tel: (916) 288-4593

11 E-mail: production@focuslitigationsolutions.com
12

13 ALSO PRESENT:

14 JACQUELYN CLARK, Union Pacific Railroad Company
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1 the '90s, people began to learn how to cheat on
2 them. And it became easy-to-get information on how
3 to get around those tests. So those tests became
4 compromised; so a whole development sector began in
5 looking for ways to develop a new color vision test
6 that could be administered that were difficult to
7 cheat on.

8 The gold standard color vision test that
9 has always been around since the late 1800s, the
10 anomaloscope, the Air Force used that as a final
11 determinant, but not everyone out there
12 occupationally, clinically, has access to an
13 anomaloscope; so the thrust of the industry has been
14 to try to come up with a foolproof color vision test
15 that gets away from some of the things or games that
16 can be played with traditional color vision tests
17 like the Ishihara and Dvorine and others like it.

18 Q Okay. Thank you.

19 The anomaloscope -- is the issue there
20 that -- is it cost or simple availability that is a
21 limiting factor?

22 A There -- it -- it's primarily cost. There
23 are not a lot of them, but there's -- it also
24 requires a certain amount of expertise to administer
25 them and to keep them standardized. So you really

1 need dedicated staff to administer them. It's not
2 something that's practical, for example, the general
3 aeromedical examiner who, you know, there's
4 thousands of them around the country who are
5 screening pilot applicants on behalf of the FAA.
6 They don't -- they want a simple test to use, that's
7 cheap to purchase, and that gets them where they
8 need to be.

9 So the anomaloscope is more complicated; so
10 you will find those at research centers and --
11 however, they are the gold standard for determining
12 the type and degree of a color vision defect,
13 whereas those other tests I mentioned before are
14 screening tests and have limitations.

15 Q Okay.

16 A If you want to know what somebody's color
17 vision defect is or isn't, you do an anomaloscope
18 testing, testing both red/green or blue/yellow.

19 Now, beyond anomaloscopes today, there
20 are -- there are new electronic systems that are
21 coming into play. The CAD test would be one, the
22 CCT test, the Waggoner test. These are all
23 computer-based ones that are being validated to see
24 if they can replace anomaloscopes because they can
25 then be more readily available to anyone to purchase

1 understand how they all related.

2 Q Okay. Was that an important process,
3 that -- testing individuals -- is that an important
4 part of the validation process for the cone contrast
5 test?

6 A Yeah. That's when we -- you -- or any
7 test. You basically want to make sure that the test
8 is sensitive enough to identify somebody who has got
9 the problem. And then you also have to have a test,
10 that if they -- they are specific enough, that if
11 you pass it, you truly are normal.

12 So all of that stuff is part and parcel of
13 what is done with all color vision tests. And all
14 color vision tests have numbers of specificity and
15 sensitivity that are used to determine how good a
16 test is for that purpose.

17 And all those other tests are then
18 ultimately compared to the anomaloscope gold
19 standard to see how well it compares to that gold
20 standard test.

21 And that's all part of -- or one part of
22 one type of validation that goes on with color
23 vision testing -- or any testing, really, any
24 medical testing.

25 Q Okay. Does it also help determine whether

1 there's a risk of false positive tests results?

2 A Oh, absolutely. Yeah, absolutely. Because
3 even the Ishihara test, normals can fail that, and
4 then you have to -- you have to decide whether you
5 can just live with the possibility of rejecting
6 somebody who is normal and they just made a mistake,
7 or they didn't understand or miscalculated something, or
8 basically just move on and discard them, or you go
9 back and you try to salvage them.

10 So within anybody who would fail the
11 Ishihara, or any PIP test, you are looking to see if
12 they truly are normal on another test -- or abnormal
13 on another test.

14 Q Okay. How long did you work with
15 Dr. Rabin?

16 A Oh, I have known Dr. Rabin, Army Air
17 Force -- the relationship since probably the '90s.
18 And I don't remember when we brought him to Brooks
19 after -- after his predecessor passed away. But he
20 was at Brooks, ballpark, 10 years, at least, right?
21 I may be off on that, but it seems like it was at
22 least 10 years. But I could tell you 10 years and
23 you could tell it was me 20, and I would say, "Yeah,
24 time is flying for me too."

25 But, yeah, I would say 10 years we worked

1 sense?

2 A Yes. I have no problem with that. I
3 understand.

4 Q Okay. Thank you.

5 When did you first become aware that Union
6 Pacific was developing a new color vision field
7 test?

8 A I can't be really specific about when I was
9 aware of that. I can tell you that I -- I believe
10 in -- well, certainly, our first look at the light
11 cannon, the first model of the light cannon -- and
12 when I talk about light cannon, then we should also
13 agree that we mean the LED one, right?

14 So we call it the new light cannon, but
15 it's really the first new light cannon, right?

16 So that's the one I'm addressing here.

17 We became aware of that somewhere before
18 October of 2015, because in October of 2015 is when
19 we actually conducted the on-site evaluation of it
20 here in San Antonio. In terms of specifically, I
21 don't know how many months prior to that. I don't
22 think it's in the report, but I can certainly look
23 and see if it is, if you need a more specific answer
24 to that or see if it's in the report.

25 But it was obviously a matter of a couple

1 A You should have that. I -- I'm pretty sure
2 you have that, correct?

3 MR. BARNEY: Yes. I will go ahead and mark
4 this as Exhibit 4.

5 (Exhibit No. 4 was marked for
6 identification.)

7 BY MR. BARNEY:

8 Q This is the "Draft Final Report" dated 25
9 January 2016.

10 Is this the report that you are -- you are
11 looking at?

12 A Yes, it is.

13 Q And is there a -- it's -- obviously, it
14 says "Draft" at the top.

15 Is there a version of this that does not --
16 is not considered a draft report?

17 A Negative.

18 Q Okay. Is there --

19 A Not that I ever -- not that I ever saw.
20 Not submitted from Dr. Rabin or myself. Whether
21 somebody internally took that word "Draft" off, I
22 don't know. But I have never seen. It's always
23 been in this format.

24 Q Is there a reason this is a considered a
25 draft as opposed to a final version of this?

1 A I think -- yeah. Just a procedural one, in
2 terms of letting other folks read through it.
3 Dr. Rabin and anyone else that needed to read
4 through it, in case there were mistakes, issues,
5 concerns. It's just kind of the habit to label
6 something a draft until it has a chance to be by --
7 be reviewed by participants and make sure that we
8 got the observation and the comments correct.

9 Q And was there ever an effort to finalize
10 this draft and -- or -- not -- strike that.

11 Was there ever a -- were you ever asked to
12 finalize this to get to a version that was not -- no
13 longer considered a draft?

14 A No. I think what happened after this was
15 we moved into the second effort, the more elaborate
16 effort, to look at the device, the redesigned device
17 that followed this.

18 So the answer to your question is "No," I
19 was not asked, to my best recollection, to finalize
20 this. This is the only thing I ever remembered
21 submitting.

22 Q Okay. And this indicates that you and
23 Dr. Rabin are the primary authors of this report.

24 Were there any other authors?

25 A No.

1 Q Just you and Dr. Rabin?

2 A That's correct.

3 Q Was this report considered a validation
4 effort?

5 A No. None -- not -- not from my
6 perspective. I mean, to me, this was a -- a first
7 look at a prototypic device to evaluate it, to see
8 what needed to be done to it, to make improvements
9 to it. Because it was clear that the design
10 features, the major design flaws that both Dr. Rabin
11 and I saw would require a redesign before proceeding
12 further with looking at other issues.

13 So I don't -- I didn't see this as a
14 validation in a traditional sense. I mean, it was
15 an attempt to validate the Lantern as a tool to be
16 used. You might -- you could maybe say that. But I
17 don't see -- didn't see this as a validation step.

18 Q Okay. I'm going to go to page -- page 3 of
19 the report, labeled "Executive Summary."

20 A Um-hmm.

21 Q Down at the -- it's the third paragraph
22 down, reads, [as read] "The objectives of the
23 observational field study of the light -- of the LC"
24 -- I'm assuming "LC" means light cannon in this
25 context?

1 is to -- obviously, it's a multifaceted thing.
2 It -- it's to make sure that once the design has --
3 features have been improved to eliminate the -- not
4 the positional cues; once the luminance values were
5 adjusted so that you could eliminate the luminance
6 cue or keep it, in addition, as a -- as a false clue
7 for trying to catch folks -- color vision
8 defectives -- once you did all of that, then you
9 would then go ahead back to the -- to doing
10 scientific and operational studies and -- as a part
11 of a complete validation program for the device.

12 Q Okay. The next paragraph goes on to state
13 that [as read] "While the new LED-based CVFT test
14 represents a logical and worthy technical step
15 forward as a potential relevant -- potentially
16 relevant occupational field test, it is the opinion
17 of the vision consultants involved in this -- in
18 this initial field study that the existing
19 prototypical light cannon device has a number of
20 critical shortcomings in its current design and
21 within the proposed test administrative procedures
22 that will diminish its reliability and effectiveness
23 if it were to be deployed 'as is' as a final
24 determinant for the purpose of declaring an
25 individual fit to perform effectively and safely on

1 color -- on critical color vision-based tasks
2 expected" -- excuse me -- "expected to be
3 encountered operationally on the railroad."

4 Was -- does that -- does that accurately
5 encapsulate your opinion at the time?

6 A Yes.

7 Q Has your opinion changed as to this version
8 of color vision -- of the light cannon test?

9 A With respect to this prototype? No. Those
10 words go -- those concepts and words still apply.

11 Q Has your opinion on the light cannon test,
12 as it currently stands today, changed?

13 A You mean on the second part of that?

14 Q Sure.

15 A Well, I mean, obviously, engineering
16 changes were made in the device to make it better.
17 There was still dialogue in terms of that device was
18 still being looked at procedurally in terms of how
19 to best administer it, that -- the testing
20 protocols, if you will, there. And then also the
21 issue of whether we, or Union Pacific, wanted to
22 change the luminance differences within the light
23 heads to remove that cue.

24 Those were still being discussed in that
25 second group process that was with -- and headed by

1 their document, I think, down here on -- if you go
2 further on down to 23, we basically -- I speak in
3 that last paragraph -- or we speak in that last
4 paragraph -- of the CIE recommending their -- if you
5 are going to do a practical test, here's what it
6 must do. And they are listed there.

7 Q Okay. Let me go back up to page 22. In
8 the middle of the page there, under "CIE Technical
9 Report," that heading --

10 A Um-hmm.

11 Q -- it says, [as read] "One of the key
12 reference documents often cited in discussion" --
13 oh, sorry. I mis- -- I'm misreading.

14 Sorry. Going back to the top of the
15 paragraph.

16 A Okay.

17 Q I keyed in on the word "key."

18 But the first paragraph of the page is, [as
19 read] "The key to any practical color vision test is
20 to link all possible color vision performance tasks
21 to be occupationally encountered, to include
22 variations in operational environment that may
23 degrade the vision performance from the ideal. The
24 process to get there should be occupationally and
25 scientifically validated by experienced operational

1 personnel and occupational medicine and vision
2 experts. It should be standardized, reproducible,
3 and equitable."

4 Is that the -- are you describing a process
5 to validate the efficacy of the test?

6 A In concept, in the overall concept, yes.
7 That would be a -- basically a synthesis with -- of
8 all the -- all the principles that this kind of
9 testing should employ, to include the CIE's feel
10 about -- about this kind of an endeavor.

11 So, yeah, that's -- that's conceptually
12 applicable here.

13 Q Okay. And is that -- is that in order to
14 maximize the detection of people who might have
15 color vision deficiencies and may be on -- and --
16 strike that.

17 Is that -- is the purpose of -- of that
18 validation process to maximize the -- the detection
19 of individuals with color vision deficiency?

20 A I think that's one aspect of it. But the
21 other aspect is to make sure that you are not --
22 that color normals are not being discarded because
23 they are not -- the test is not identifying them to
24 be color normal.

25 So that's the -- gets into that specificity

1 can before you go through the entire process.

2 Q Okay. I'm going to direct you to one more
3 section on this -- on this document. This is under
4 the "Conclusions," page 26.

5 And as you've pointed out -- you've
6 testified to this already. You -- I think you used
7 almost the exact wording.

8 "In our opinion" -- it starts, [as read]
9 "In our opinion, while certainly worthy of continued
10 development" -- sorry. I -- you did not actually
11 testify to this. I apologize.

12 It said -- it reads, [as read] "In our
13 opinion, while certainly worthy of continued
14 development, the light cannon device is -- in its
15 current form remains technologically immature in the
16 short term; lacks necessary scientific and
17 occupational validation, e.g. as reported by the
18 NTSB following Goodwell; and addresses only a
19 specific LED-based signal light recognition task
20 within a wayside signal system that currently does
21 not yet exclusively use LED signal lights. Most of
22 these disconnects can be addressed with simple
23 engineering improvements and a suitable -- a
24 suitable validation program, but until the process
25 is complete and the light -- the signal light

1 recognition tasks only involve LED wayside signals,
2 exclusive reliance on the light cannon in its
3 current form without proper validation" -- moving on
4 to the next page -- "validation as the only test to
5 verify safe performance in critical color vision
6 railroad tasks is problematic and changeable."

7 A "Challengeable."

8 Q "Challengeable." Thank you.

9 "Challengeable." I -- my mistake. Thank you for
10 correcting me.

11 Does that accurately express your opinions
12 of the light cannon test in its form at that time?

13 A Yes.

14 Q Based on that -- on that assessment, the
15 light cannon -- in the form that it was in at that
16 point, would you consider that a test that should be
17 administered?

18 A I'm sorry. Would you rephrase that --

19 Q Yes.

20 A -- one more time?

21 Q Yes. At that time, when you had this
22 opinion of the -- of the light cannon test, did
23 you -- would -- based on that opinion, would you
24 consider the light cannon a test that should have
25 been utilized in the field?

1 When you refer to "that effort," is that
2 the second assessment process with Dr. Garber that
3 you referred to several times?

4 A Yeah. Because it references up here --
5 remember, now, the second step is now going to be
6 led by Dr. Garber and his organization. And why she
7 just mentions him and Dr. Rabin, and not everybody
8 else that they were soliciting participation in, I
9 don't know. But I guess it's because it's the key
10 players from outside Union Pacific, because I think
11 most of the other people were already on board here
12 as contractors.

13 And, again, I'm speculating here. These --
14 these would be notable outliers from outside the
15 U -- the Union Pacific environment.

16 So this is definitely in preparation for
17 the second step. The second -- looking at the
18 second model.

19 Q Okay. Are you aware of any -- any
20 additional validation efforts that were performed
21 between January 2016, when you provided your report,
22 and October 24th, 2016, the date of this letter?

23 A No. You mean -- you mean, am I aware of
24 any things that may have happened to get us from
25 that Lantern to the second Lantern in -- during this

1 interim or any modifications thereof?

2 Q No. I'm asking whether you are aware of
3 any additional evaluation of the test between that
4 period.

5 A I'm not aware. I know that certain things
6 happened when we kicked off that second
7 organization. There were some measurements that
8 were collected out in the field by Union Pacific. I
9 don't know if those were done just before this or
10 afterward, but I know a lot of that continued.

11 So it's possible that there were some
12 luminance measurements taken by UP in the field that
13 was going on during this interim that I was not
14 aware of.

15 Q Okay. Do you know whether there was any --
16 strike that.

17 Do you recall what the scope of this --
18 this evaluation -- this second evaluation process
19 was?

20 A That scope may have been addressed by that
21 other document that you showed. The one that was
22 signed by -- that -- the email that basically talked
23 about face validity. There may be some scope in
24 that.

25 But, certainly, my recollection of this was

1 Dr. Rabin finished the work he was doing with
2 subjects by that 2019 date?

3 A I can't say for sure that he was finished.
4 I was not really involved with some of the
5 subsequent efforts that I understood went on. I was
6 only involved with that initial foray of getting
7 that first procedural methodology exercise done.
8 And I don't recall if he -- if he finished all of
9 that and did -- published all of that data.

10 Q Okay. Did you produce a -- any sort of
11 report as a part of the second -- second assessment
12 process?

13 A That was all. The -- basically that
14 process generated an outline for a final report on
15 the second -- the second effort, the second light
16 cannon. And the idea there was for -- and this --
17 that was constructed by Dr. Garber. And the idea
18 there, he had -- he had added some background
19 material, and we were going to then plug in
20 individual pieces of the effort, including the
21 luminances, the measurements of what was online, and
22 other data as -- as it came in. And basically then
23 use that outline to put material in it, and
24 eventually a final document would come out.

25 That is largely the piece that I -- I sent

1 to you the last time, in terms of my background
2 material that was submitted as a part of supporting
3 the background of that major report, which was still
4 ongoing.

5 So I -- I have not seen that finalized. I
6 don't know what else has been put into it since.
7 But that material that I gave you, that extensive
8 background material, was meant to, obviously, allow
9 people to have a better understanding of the
10 terminology and the sciences that would be necessary
11 to understand this entire effort.

12 MR. BARNEY: I'm going to mark this as
13 Exhibit 6.

14 (Exhibit No. 6 was marked for
15 identification.)

16 BY MR. BARNEY:

17 Q Is this the -- I think you referred to it
18 as an outline, that you are referring to, that you
19 worked with Dr. Garber on?

20 A Yeah. That appears to be it. If you can
21 scroll down. I don't know how many pages you have.
22 You have 12 pages and -- yes.

23 Q I will -- I will represent to you that
24 there are two separate documents that were produced,
25 but I think you are referring to both of them kind